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ABSTRACT

This study is the final report of an investigation into the effectiveness of Student Teams Achievement Divisions (STAD), a system of cooperative learning at the postsecondary level. The study specifically examined the relationships between a student's evaluation of his/her own effectiveness as a STAD team member, and other variables in a collaborative educational psychology course. Students (n=154) were assigned to eight heterogeneous teams which met together weekly to work on projects. At the end of the semester students rated both the course and themselves and their team members. The study found: (1) a substantial positive correlation between the student's self-rating and the rating given him/her by other team members; (2) a substantial positive correlation between the student's self-rating and the mean rating given to other team members; (3) a modest, positive correlation between the student's self-rating and the student's evaluation of the course; (4) a modest positive correlation between the student's self-rating and the student's evaluation of the teacher's motivational decisions; and (5) positive correlations between the student's self-rating and most of the student's formal grades. Appended are data tables, course rating scales, and team member performance appraisal forms. (Contains 18 references.) (DB)

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CORRELATES OF SELF CONCEPT IN COLLABORATIVE LEARNING

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CORRELATES OF SELF CONCEPT IN COLLABORATIVE LEARNING

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Perspective

This study is the eighth in a series of investigations of the effectiveness for university students of Student Teams Achievement Divisions (STAD), one system of cooperative learning. These studies have been based on the research of Robert E. Slavin (1983, 1989, 1990, 1991) who focused primarily on STAD's use in public schools. This system features small heterogeneous teams of 4-6 members who tutor each other on the material in the course and prepare each other for weekly quizzes that measure chapter objectives. Students take the quizzes individually, but are awarded bonus points on the basis of the team's mean quiz score.

In our first experiment (Gnagey, 1988), four sections of sophomore educational psychology students (N=145) were divided into equivalent experimental and control groups. After a three week baseline period, both groups were taught in the STAD format for the rest of the semester. While students in the control group were awarded bonus points on the basis of the mean improvement of their teams, students in the experimental group received bonus points for their own individual improvement. Although no significant differences were found in the achievement of the two groups, the experimental classes rated the course as more effective than did the control classes.

In our second experiment (Gnagey & Ostrowski, 1991), it was hoped that the social loafing of some team members could be prevented by publicizing their individual contributions to their teams. Two classes of educational psychology students (N=75) randomly assigned to control and experimental sections were taught in a conventional lecture-discussion format for a four week baseline period. Both the experimental and control sections were taught using the STAD approach for the remainder of the semester. The control class received anonymous feedback concerning their team's quiz performance, whereas the experimental class received additional feedback making them privy to the scores of other members of their own teams. No significant differences were found between the mean quiz, midterm, and final exam scores for the two sections.

In our third experiment (Gnagey & Ostrowski, 1992), we tried to determine the differential effects of two ways of awarding bonus points within the STAD format. Two forty-student adolescent development classes and two forty-student educational psychology classes served as subjects in parallel experiments. During the first half of the semester, all classes were taught in the same STAD format in which bonus points were awarded to all members of the three teams with the highest mean chapter quiz scores. During the last half of the semester, students in one randomly chosen adolescent development class and one randomly chosen educational psychology class were awarded bonus points on the basis of their team's mean improvement points. The award structure of the other two classes remained the same. For each experiment, the mean scores of the experimental and control groups were compared on seven

quizzes, a final examination, and the University Course Rating Scale. In each experiment, the "mean improvement points" class outscored the "mean raw score" class on only one chapter quiz. It was concluded that the independent variable was not robust enough to materially influence either students' achievement or their evaluation of the course.

In our fourth experiment (Gnagey & Navarro, 1993), we compared the effects of two methods of constructing learning activities for classes being taught in the STAD format. One hundred fifty-four students in four sections of educational psychology served as subjects. During the first half of the semester, all sections were taught in the same STAD format during which the instructor authored and assigned activities designed to assist team members in preparing each other for the weekly chapter quizzes. During the second half of the semester, two randomly chosen experimental classes prepared and carried out their own activities, while the two control sections continued to use those prepared by the instructor. Comparisons of the experimental and control group means on five chapter quizzes, the final examination, and the University Course Rating Scale revealed no significant differences on any of these measures of achievement or the course evaluation. It was concluded that after one-half a semester's experience with instructor-constructed learning activities, student teams were able to plan and carry out some that were at least as effective as those constructed by their teacher.

In our fifth experiment (Gnagey & Navarro, 1994), we wanted to see if awarding bonus points for both mean quiz scores and mean improvement points would produce higher class achievement and course evaluation than either method by itself. One hundred fifty-four educational psychology students in four sections of educational psychology served as subjects in the experiment. At the beginning of the semester, all sections were taught in the usual STAD format with bonus points being awarded for correctly completing learning activities on Wednesdays, and for being in one of the four teams scoring highest on the weekly chapter quizzes. After Quiz 4, one section chosen at random began getting bonus awards for improvement scores while the other three sections continued being awarded points for high mean team quiz scores. After the midterm examination, two of these three teams were randomly assigned to other treatments. In one section, the two teams with the highest mean quiz scores and the two with the highest mean improvement scores were awarded bonus points. In the second, the four teams with the highest mean improvement points were rewarded. At the end of the semester, a final examination, and the University Course Rating Scale were administered to all sections. No significant differences were found on any of these comparisons save for two chapter quizzes. It was concluded that none of the experimental variations had a systematic effect on either learning or course evaluation.

In our sixth experiment (Gnagey and Denoyer, 1995) we compared process and product methods of awarding bonus points to STAD teams. One hundred sixty-five students in four sections of educational psychology served as subjects in the experiment. They were assigned by the usual registration procedures employed by

the University and were mostly sophomores taking their first course in a program designed to produce high school teachers.

For the first three weeks of the semester, all four classes were taught according to the usual STAD format. A General Linear Models Analysis indicated that there were no significant differences among the four sections on any of the first three quizzes. At this time, two experimental and two control groups were selected using a random number table. While the Wednesday teamwork and Friday quizzes remained the same for all sections, the teamwork for the experimental sections was graded as a project instead of being the basis for bonus points. Bonus points were awarded instead for mean quiz scores. In essence, the experimental subjects received bonus points for a learning product (quiz scores) while the control sections continued to be rewarded for a learning process (learning activities). T-tests were performed between the combined experimental and combined control group data for the remaining nine chapter quizzes, the midterm and final examinations, and the first and second administrations of the University Course Rating Scale (a course evaluation device) and the Team Member Performance Appraisal (a combined rating of the effectiveness of one's team members). Since no significant differences appeared in any of these analyses, it was concluded that teachers may award extrinsic reinforcers for either learning activities (the learning process) or quiz scores (the learning product) with equal results in the acquisition of subject matter, the evaluation of the course, and the attitudes developed among teammates.

In our seventh experiment (Gnagey & Potter, 1996), we assessed the differential effects of a one-team and a two-team approach to the Slavin's STAD format for collaborative learning. Four sections of educational psychology students (N=169) were randomly divided into 2 experimental and 2 control classes after being taught for the first eight weeks of the semester in the usual STAD format. During the last eight weeks of the semester, the experimental classes were assigned to new STAD teams, while the control classes remained in the teams assigned to them in the beginning of the semester. The combined data from the two experimental and two control-classes were compared at the end of the semester. No significant differences were found between the two groups on the chapter quizzes, the final examination, the University Course Rating Scale, and the Team Member Performance Appraisal. It was concluded that the formation of new groups at midterm with the additional record keeping involved, was probably a waste of the instructor's time .

Objectives

The objectives of the present investigation concern the relationships between a student's evaluation of his/her own effectiveness as a STAD team member, and several other variables in a collaborative educational psychology course. Since small group learning is central to the course, and since the operation of the team produces bonus points for each of its members, we expected to find positive relationships between measures of the effectiveness of that team, and measures of academic achievement and of instructor/course effectiveness. The following five hypotheses were tested:

1. There will be a significant positive correlation between a student's self-rating and his/her rating by the other team members.

2. There will be a significant positive correlation between a student's self-rating and his/her rating of the other team members.

3. There will be a significant positive correlation between a student's self-rating and his/her evaluation of the course.

4. There will be a significant positive correlation between a student's self-rating and his/her evaluation of the instructor's motivational decisions.

5. There will be a significant positive correlation between a student's self-rating and his/her achievement in the course.

Methods and Techniques

One hundred fifty-four students in four sections of educational psychology served as subjects in the experiment. They were assigned by the usual registration procedures employed by the University and were mostly sophomores taking their first course in a program designed to produce high school teachers.

At the beginning of the second week of the semester, students were assigned to eight heterogeneous teams using a class list which had been sorted by scores on a thirty-item quiz over the first chapter in the text. The student with the highest score was placed on team one, the second highest on team two, the third highest on team three and so on until all eight teams had one member. The ninth student was placed in team eight, the tenth in team seven, and so on until all teams had two members. The 17th student was then placed in team one, and this reversal system continued until all students were assigned. The process was done for women first and then for men in order to balance each team for gender.

For the remainder of the semester, all four classes were taught according to the usual STAD format. Each Monday, the assigned chapter was introduced and appropriate material was presented by way of lectures, films or videos. A list of key essay questions was distributed to all students with the promise that the multiple choice chapter quiz would measure their knowledge of the topics indicated by those questions. Each Wednesday, heterogeneous teams of 4-6 members convened to work on projects which involved the application of the text material to practical situations. Bonus points were awarded for accurate work.

Each Friday after the corrected teamwork was returned, the class was divided into two activities. At the beginning of the hour, the instructor held a question and answer session in which students could ask for clarification of difficult concepts found in the key questions. When there were no more questions, a 30-item multiple choice chapter quiz was administered to all students individually. At the end of the Friday class, the

appropriate chapter assignment for the following week was written on the chalkboard.

During class on the following Monday before the new chapter was introduced, all quizzes were returned, and a list of "grades so far" was posted by student social security numbers. Students were encouraged to write rebuttals, by Wednesday, to any of the items they missed but felt they should have credit for. The STAD cycle then began for the new chapter.

At midterm, a 60-item multiple choice examination was administered over the first six chapters. During the second half of the semester, the same STAD format was followed for the remainder of the chapters that were assigned.

At the end of the semester a 60-item multiple choice examination was administered to all four classes covering only those chapters assigned since midterm. The University Course Rating Scale (UCRS), the Team Member Performance Appraisal (TMPA), and the TARGETT Rating Scale were also administered at that time.

The UCRS is composed of twelve items on which students are asked to evaluate all aspects of the course: clarity of objectives, projects and papers, textbook and other assigned readings, in-class activities, quizzes and exams, feedback, interestingness, instruction, grading procedures, grading fairness, amount learned, expected level of performance (standards), and group activities (See Appendix 1).

In a previous study of 158 students, (Gnagey & Ostrowski, 1992), factor analysis of the UCRS (see appendix) using varimax rotation revealed three principal factors (See Table 1.). The first accounted for 31% of the variance and loaded heavily on items D (in-class activities), G (interestingness), H (instruction); J (amount learned), K (expected level of performance), and (group work). The second principal factor accounted for 29% of the variance and loaded heavily on items A (clarity of objectives), B (out of class papers and projects), C (text), E (quizzes and exams), and I (fairness of grades). The third factor accounted for only 11% of the variance and loaded on item F (feedback).

The test-retest coefficient of reliability for the UCRS total score was .81 using 48 students in similar classes with one administration at midterm and the other eight weeks later during the finals.

The Team Member Performance Appraisal (TMPA) rating scale (See Appendix 2) was administered requiring all students to rate themselves and the other team members of their teams on the following criteria: a) team meeting attendance, b) contribution of ideas, c) completion of assignments, d) promoting positive feelings among team members, e) encouraging the expression of other team members. The ratings were done using a 5-point scale for each criterion: one indicating "almost never" and five indicating "almost always". Three variables were derived from these scores. TMPA1

was the mean rating a student gave the other team members; TMPA2 was the mean rating a student received from the other team members; and TMPAS was a student's rating of his/her own effectiveness as a member of the team.

The TARGETT Rating Scale is based on a model organized by Epstein (1989) using six areas identified by Carol Ames (1990, 1992) where teachers make decisions that can influence student's motivation to learn. These are : (a) the nature of the learning task, (b) the autonomy students are allowed, (c) how students are recognized for their work, (d) how they are grouped, (e) how they are evaluated, and (f) how time is allotted for the work. Woolfolk (1995) added (g) teacher expectations as a seventh area. Students were asked to rate their educational psychology course on all seven criteria using the following five point scale: 5 = excellent; 4 = good; 3 = average; 2 = poor; 1 = unacceptable (See Appendix 3).

Results and Conclusions

Pearson Product Moment correlations were calculated between the student's self-rating as an effective STAD team member, and all other variables described in the hypotheses above (See Table I).

Hypothesis 1 was confirmed. There was a substantial positive correlation between TMPAS, the student's self-rating, and TMPA2, the mean rating that other team members' gave the student (r=.4296, p.=.0001). This agreement between the student and his/her team mates suggests that the self-rating has some outside validity.

Hypothesis 2 was confirmed. A substantial positive correlation was found between TMPAS, the student's self-rating, and TMPA1, the mean rating the student gave to other team members (r=.5279, p.=.0001). This finding suggests that the student sees effectiveness as a function of the team rather than of individuals.

Hypothesis 3 was confirmed. A modest, positive correlation was found between TMPAS, the student's self-rating, and UCRS1, the student's evaluation of the course (.2052, p.=.0127). Evidently, the student feels that the team process is tied to the effectiveness of the course as a whole.

Hypothesis 4 was confirmed. A modest positive correlation was found between TMPAS, the student's self-rating , and TARGET, the student's evaluation of the teacher's motivational decisions (r=.2594, p.=0015). This suggests that the student perceives the teams effectiveness to be involved with motivational structure set up by the instructor.

Hypothesis 5 was confirmed. Positive correlations were found between TMPAS, the student's self-rating, and QTOT, the grand total of all the student's quiz scores (r=.2113, p.=.0113); and FIN, the student's final examination score (r=.2707, p.=.0009). While the correlation of TMPAS with MID, the student's score on the midterm examination, was positive, it did not quite reach significance (r=.1562, p.=.0580). This

relationship to achievement is, of course, the bottom line. One could wish that the correlation were a great deal stronger.

Educational Importance

Of course, correlation does not indicate causation. It could be that a student's level of success with the team and the course influences his/her self-evaluation as an effective team member. It could also be that this self-concept influences the student's achievement in and appreciation for the instructor/course. Some researchers suggest that it probably works both ways (Marsh, 1987; Shavelson & Bolus, 1982).

Hoge, Smit, and Hanson (1990) found that teacher feedback and evaluation has a significant influence on student self-esteem. It would seem that an instructor should pay special attention to how STAD teams function, and provide accurate feedback and evaluation (such as the TMPA instrument) to the members.

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Table 1

Rotated Factor Pattern for UCRS2

Item	Factor 1	Factor 2	Factor 3
A	0.07836	0.69193	0.12490
B	0.36320	0.58192	-0.30593
C	0.19670	0.58731	-0.40395
D	0.77268	0.25255	0.06187
E	0.27006	0.71172	0.12786
F	0.10361	0.23254	0.79150
G	0.60411	0.45104	-0.18749
H	0.69302	0.41617	-0.00718
I	0.03367	0.76926	0.19525
J	0.64069	0.39456	-0.32949
K	0.73521	-0.09374	-0.00112
L	0.69043	0.07623	0.10489

Percent of Variance Explained by each Factor

Factor 1	Factor 2	Factor 3
31.31526	29.25415	11.11909

Table 2

Pearson Product Moment Correlations Between TMPAS and Other Variables for 154 Educational Psychology Students

	MID	TARGET	UCRS	TMPA1	TMPA2	QTOT	FIN
TMPAS							
r =	.1562	.2593	.2052	.5279	.4296	.2113	.2707
p. =	.0580	.0015	.0127	.0001	.0001	.0113	.0009

Section_____ Team_____ SS#_____

UNIVERSITY COURSE RATING SCALE

_____ A. The objectives of this course were clear to me. I knew what I was expected to learn. (1) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

_____ B. The assigned, out-of-class projects, papers, etc., helped me fulfill the course objectives. They assisted me in mastering the appropriate materials and skills. (1) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

_____ C. The textbook and/or other assigned readings helped me fulfill the course objectives. They assisted me in mastering the appropriate materials and skills. (1) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

_____ D. The in-class activities planned by the instructor helped me fulfill the course objectives. The experiences I had in class assisted me in mastering the course materials and skills. (1) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

_____ E. The measurement devices used in this course were accurate indicators of the extent to which I was fulfilling the objectives. They allowed me to show what I learned. 91) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

_____ F. The feedback in this course was adequate. During the semester, I knew how well I was doing. (1) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

_____ G. My interest in the course was kept high enough to motivate me to do good work. I was able to apply myself. (1) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

_____ H. In my opinion, the teaching of this course was: (1) poor, (2) fair, (3) average, (4) good, (5) excellent.

_____ I. The grades I received for this course were fair. They were what I deserved for what I learned. (1) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

_____ J. Compared with other courses I have taken at this institution, I feel that I learned: (1) much less than in most courses, (2) less than most, (3) about an average amount, (4) more than in most, (5) much more than in most.

_____ K. Compared with other courses I have taken in this institution, I feel that the level of performance expected of me was: (1) much lower than most, (2) lower than most, (3) about the same as most, (4) higher than most, (5) much higher than most.

_____ L. The group activities carried out in class helped me fulfill the course objectives. My team helped me master the course materials and skills. (1) hardly ever, (2) occasionally, (3) sometimes, (4) frequently, (5) almost always.

Section: ____ **Team:** ____ **Social Security Number:** _____

TEAM MEMBER PERFORMANCE APPRAISAL

DIRECTIONS: In the space provided, list in alphabetical order by last name, all members of your team including yourself. Rate the contribution of each member on all of the five criteria listed below. Put an asterisk (*) in front of your name.

A. Attends team meetings.
B. Contributes helpful ideas to team discussions.
C. Completes team assignments on time.
D. Promotes positive feelings among team members.
E. Encourages other team members to express themselves.

Using the following 5-point scale, rate each criterion for each team member.

5 = almost always
4 = often
3 = sometimes
2 = seldom
1 = almost never

RATINGS OF CRITERIA

TEAM MEMBER NAMES	A	B	C	D	E	SUM. OF A THRU E
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Section#_____ Team #_____ SS#_____

TARGETT MODEL RATING SCALE

Evaluate this course using the TARGETT model summarized on Table 10.1 on page 369 of your text. It has been reproduced on the back of this sheet. Rate each of the seven areas on a five point scale: 5 = excellent; 4 = good; 3 = average; 2 = poor; 1 = unacceptable. In the space provided, explain each rating, referring to the objectives and examples provided on the table.

____ Task

____ Autonomy/Responsibility

____ Recognition

____ Grouping

____ Evaluation

____ Time

____ Teacher Expectations

____ Total Rating (Sum the six area ratings.)

TABLE 10.1 The TARGETT Model for Supporting Student Motivation to Learn

Teachers make decisions in many areas that can influence motivation to learn. The TARGETT acronym highlights task, autonomy, recognition, grouping, evaluation, time, and teacher expectations.

TARGETT Area	Focus	Objectives	Examples of Possible Strategies
Task	How learning tasks are structured—what the student is asked to do	Enhance intrinsic attractiveness of learning tasks Make learning meaningful	Encourage instruction that relates to students' backgrounds and experience Avoid payment (monetary or other) for attendance, grades, or achievement Foster goal setting and self-regulation
Autonomy/ Responsibility	Student participation . . . in learning/school decisions	Provide optimal freedom for students to make choices and take responsibility	Give alternatives in making assignments Ask for student comments on school life—and take them seriously Encourage students to take initiatives and evaluate their own learning Establish leadership opportunities for *all* students
Recognition	The nature and use of recognition and reward in the school setting	Provide opportunities for *all* students to be recognized for learning Recognize *progress* in goal attainment Recognize challenge seeking and innovation	Foster "personal best" awards Reduce emphasis on "honor rolls" Recognize and publicize a wide range of school-related activities of students
Grouping	The organization of school learning and experiences	Build an environment of acceptance and appreciation of all students Broaden the range of social interaction, particularly of at-risk students Enhance social skills development	Provide opportunities for cooperative learning, problem solving, and decision making Encourage multiple group membership to increase range of peer interaction Eliminate ability-grouped classes
Evaluation	The nature and use of evaluation and assessment procedures	Grading and reporting processes Practices associated with use of standardized tests Definition of goals and standards	Reduce emphasis on social comparisons of achievement Give students opportunities to improve their performance (e.g., study skills, classes) Establish grading/reporting practices that portray student progress in learning Encourage student participation in the evaluation process
Time	The scheduling of the school day	Allow the learning task and student needs to dictate scheduling Provide opportunities for extended and significant student involvement in learning tasks	Allow students to *progress at their own rate* whenever possible Encourage flexibility in the scheduling of learning experiences Give teachers greater control over time usage through, for example, block scheduling
Teacher Expectations	Beliefs and predictions about students' abilities	Hold appropriate but high expectations for all students Communicate that you expect growth	Give all students the chance to revise and improve their work Monitor who gets which opportunities Make sure materials show diversity in achievement

Source: M. L. Maehr and E. M. Andermann (1993). Reinventing schools for early adolescents: Emphasizing task goals. *The Elementary School Journal, 93*, pp. 604–605. Published by The University of Chicago Press. Adapted by permission.